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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,667	01/22/2002	Norihisa Mino	10873.876US01	8002

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EXAMINER	
BERNATZ, KEVIN M	

ART UNIT	PAPER NUMBER
1773	

DATE MAILED: 09/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/055,667	MINO ET AL.	
	Examiner	Art Unit	
	Kevin M. Bernatz	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 56-67 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 56-67 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 4/12/04.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Amendments to claim 56, filed on June 1, 2006, have been entered in the above-identified application.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Examiner's Comments

3. The Examiner notes that the limitation limiting R1 and R2 to "alkyl having 1 – 30 carbon atoms" is technically incorrect, since an alkyl group is explicitly defined as "-C_nH_{2n+1}-" (e.g. $-CH_3$, $-CH_2CH_3$, etc.), which has only one free bond. Applicants' specification only discloses the language "based on a an alkyl group", which the Examiner deems is equivalent to stating that R1 and R2 consist of C and H. For the purposes of evaluating the prior art, the Examiner has interpreted claim 56 as reciting that "R1 and R2 are the same or different and each [is alkyl having] consists of hydrogen atoms and/or 1 to 30 carbon atoms ...".

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 56 – 67 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "alkyl" in claim 56 is used by the claim to mean the language as noted above in Paragraph 3, while the accepted meaning is "$-C_nH_{2n+1}$." The term is indefinite because the specification does not clearly redefine the term. For the purpose of evaluating the prior art, the Examiner has interpreted the claim as recited above in Paragraph 3.

Claim Rejections - 35 USC § 102

Claim Rejections - 35 USC § 103

6. Claims 56 – 60 and 63 – 65 are rejected under 35 U.S.C. 102(a) and/or (b) as being anticipated by ***or, in the alternative, under 35 U.S.C. 103(a) as obvious over*** Bethell et al. (WO 96/07487).

Regarding claim 56, Bethell et al. disclose an article comprising particles, a substrate and a polyfunctional linking molecule (i.e. applicants' "organic film"), wherein the particles are fixed on the substrate via the organic film (*Abstract and Figures*), wherein the structure and organic film meet applicants' claimed limitations (*Figures and page 8, line 16 bridging page 15, line 4 – especially embodiment IV on page 13 in view of disclosed "G" embodiments and page 12, lines 11 – 20*). The Examiner notes that applicants' claims are open to additional elements, so substituted benzene rings and "G" groups comprising additional components still read on the claimed R1-Y-R2 structures.

While the Examiner maintains that there is sufficient specificity in the disclosure of Bethell et al. to anticipate the claimed invention, the Examiner acknowledges that Bethell et al. fail to explicitly disclose an embodiment meeting applicants' claimed limitations and also discloses a large selection of possible materials from which to "pick and choose".

However, the Examiner deems that the claimed Y groups are known functional equivalents in the field of "G" groups for use in the

structure of the linking group that is also taught as an equivalent functional element, as taught by Bethell et al. above.

Substitution of equivalents requires no express motivation as long as the prior art recognizes the equivalency. In the instant case, the structures of applicants' Y groups are functional equivalents to the structures of the disclosed "G" groups, which are equivalents in the field of polyfunctional linking chains for bonding particles to substrates. In re Fount 213 USPQ 532 (CCPA 1982); In re Siebentritt 152 USPQ 618 (CCPA 1967); Graver Tank & Mfg. Co. Inc. v. Linde Air Products Co. 85 USPQ 328 (USSC 1950).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Bethell et al. to select a compound meeting the claimed limitations as taught by Bethell et al. since selection of a known functional equivalent is within the knowledge of one of ordinary skill in the art and no unobvious difference has been shown for the distinctly claimed species.

Regarding claims 57, 58 and 60, Bethell et al. disclose the claimed limitations in the sections noted above (*Figures and page 8, line 16 bridging page 15, line 4*).

Regarding claims 59, 63 and 64, Bethell et al. disclose particles meeting applicants' claimed limitations (*page 1, line 1 bridging page 2, line 22*).

Regarding claim 65, Bethell et al. disclose substrates meeting applicants' claimed limitations (*claim 4 – where the Examiner notes that in multistacked layers of particles, the lower layer functions as the "substrate"*).

7. Claims 61 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bethell et al. as applied above, and further in view of Black et al. (U.S. Patent App. No. 2002/0022111 A).

Bethell et al. is relied upon as described above.

Bethell et al. fail to disclose depositing the particles in concave/convex patterns meeting applicants' claimed limitations.

However, Black et al. teach depositing particles in concave and convex patterns to improve the uniformity of the deposited array of particles (*Figure 3 and relevant disclosure thereto*). Regarding claim 62, Black et al. ('111 A1) teach that the relative sizes of the particles and the width of the concave portion can be varied to effect the recording and bit densities in a patterned magnetic recording medium (*Paragraphs 0097 – 0101 and Figure 3*) as well as for fabricating electronic arrays (*Paragraph 0078*). Therefore, the Examiner deems that it would have been obvious to one having ordinary skill in the art to determine an amount of the relative values of the width of the concave portion versus the particle size meeting applicants' claimed limitations by optimizing the results effective variable through routine experimentation.

Specifically, the Examiner notes that Black et al. ('111 A1) teach preferred embodiments wherein 9, 16 or even 25 particles (3x3, 4x4 or 5x5 arrays) are located in

the concave portions. Since one of ordinary skill in the art would readily possess the knowledge that excess space in the concave portion equates to lost recording density, the optimization between the relative width of the concave portion and the particle diameters is deemed to be within the knowledge of one of ordinary skill in the art given the teachings in Black et al. ('111 A1) regarding the effect of particle density on areal recording density.

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Bethell et al. to utilize concave/convex patterns meeting applicants' claimed limitations as taught by Black et al. ('111 A1) inorder to improve the uniformity of the deposited particle array.

8. Claims 66 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heath et al. (U.S. Patent No. 6,159,620) in view of Bethell et al. as applied above in Paragraph 6.

Regarding claim 66, Heath et al. teach semiconductor devices (*Title*) comprising particles (*Figure 3, element 14*) wherein a barrier layer serving as a tunnel barrier layer (*element 12*) provided on a semiconductor substrate (*element 10*) and an electrically insulating layer is provided on the barrier layer and the fine particle layer (*element 16*).

Heath et al. fail to teach a first and second monomolecular organic coating film meeting applicants' claimed limitations.

However, Bethell et al. teach a first and second monomolecular film meeting applicants' claimed limitations as described in Paragraph 6 above inorder to form

uniform, patterned arrays possessing controlled magnetic properties (*page 1, lines 1 – 19*).

It would therefore have been obvious to one of ordinary skill in the art at the time of applicants' invention to modify the device of Heath et al. to use a first and second monomolecular coating meeting applicants' claimed limitations as taught by Bethell et al. inorder to form uniform, high density patterned arrays possessing good stability.

Regarding claim 67, Heath et al. teach semiconductor devices (*Title*) comprising a barrier layer serving as a tunnel barrier layer (*Figure 4, element 28*) between a gate insulating film (*element 32*) and a semiconductor substrate (*element 26*), the barrier layer provided on the semiconductor substrate.

Response to Arguments

9. The rejection of claims 56 - 67 under 35 U.S.C § 102(e) and/or 103(a) – Black et al. (various references), alone or in view of various references

The above noted rejection has been withdrawn in view of applicant(s) arguments, which have been found persuasive. Specifically, applicant(s) argue that the organic coating films taught by Black et al. are inert and are not reactive with the linking molecule, which is explicitly taught to bond to the particle itself and not to the organic coating film, which is deemed to not be anticipated, nor rendered obvious, by the above noted rejection.

10. The rejection of claims 56 - 67 under 35 U.S.C § 102(a), 102(b), and/or 103(a) – Bethell et al., alone or in view of various references

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

11. While none of the claims have been indicated as allowable, the Examiner notes that Bethell et al. appears to lack sufficient specificity to anticipate or render obvious a claim directed to the following embodiments:

R1 and R2 are the same or different and each consists of hydrogen atoms and/or 1 to 30 carbon atoms,

wherein R1 and R2 are directly bonded to said Y group and said Y group consists of a single moiety selected from the group consisting of –CO-, -OSi-, -SiO-, -ϕ-NH-, -NH-ϕ-, -ϕ-CH_2-ϕ-, -CH=N-, -N=CH-, -ϕ-CO-, -CO-ϕ-, -ϕ-CH_2-ϕ(-CHO)-, -ϕ(-CHO)-CH_2-ϕ-, -NH-CO-NH-, -CO-NH-O-, -O-NH-CO-, -CHOH-CH_2-NH-, -NH-CH_2-CHOH-, -CO-O-, -O-CO-, -NH-CO-, and –CO-NH-, where ϕ is a benzene ring.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wessels et al. (U.S. Patent No. 7,030,271 B2) teach a multifunctional linking chain between a particle and a substrate, but fails to teach the specifics of the R1-Y-R2 linkage since the FUNC groups are required to be non-

hydrocarbon groups (*col. 3, lines 1 – 3 and col. 3, line 26 bridging col. 8, line 64*). Kambe et al. (U.S. Patent App. No. 2005/0170192 A1) teach inorganic/organic polymer composites using a polymeric linking chain, but only teach a structure of X-R-X', which does not read on the claimed –X2-R2-Y-R2-X1- structure (*Paragraphs 0066 – 0070 and 0080 - 0082*).

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin M. Bernatz, PhD
Primary Examiner

KMB
August 18, 2006